

### **ABSTRACT OF THE DISCLOSURE**

A system for three-dimensional (3-D) facial animation, including a base 3-D surface model representing a human face, and a set of displacement fields representing surface motion patterns associated with muscle movements. Each displacement field is a displacement vector varying over vertices of the base surface model and an intensity variable. Both the base surface model and displacement fields are acquired from a live subject by 3-D acquisition. The data are acquired using a surface acquisition system, capable of measuring the coordinates of a set of points on the subject's face and reconstructing the facial surface as a surface model. The base surface model is acquired by reconstructing the surface of the subject's face in the neutral pose. Each displacement field is acquired by reconstructing the surface of the subject's face in a series of poses of a muscle movement at increasing intensities. This results in a sequence of surface models exhibiting the changing shape of the face over the progress of the muscle movement. The displacement field is derived by calculating displacements at each selected intensity value and then interpolating over the known displacements.

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